European Cooperative Programme for Plant Genetic Resources

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STATUS OF THE NATIONAL ALLIUM COLLECTION - GERMANY

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Two Allium collections merged

about 2,100 accessions are permanently maintained in the field

Allium Crop Collection
1,400 accessions of 76 species

Taxonomic Reference Collection
~ 1,300 accessions of 287 species

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Safety duplication percentage

Species/Crop		%
Garlic (*Allium sativum* L.)	Cryo	45
Shallot (*Allium cepa Aggregatum Group*)	Cryo	43
Common onion (*Allium cepa* L.)	Seed	63
Chive (*Allium schoneoprasum* L.)		
Leek (*Allium porrum* L.)	Seed	100
Spring onion (*Allium fistulosum* L.)	Seed	20
TOTAL		20

Comments:

- In cryo at IPK
- Cryo duplication in progress
- Seed as ABS sample

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Structure of the GARLIC collection by country

Country of origin	Number of accessions	Country of origin	Number of accessions
Georgia	101	Former Soviet Union	25
Germany	49	France	22
USA	36	Italy	19
Romania	34	Spain	18

Comments:
Allium sativum

Other accs: 158

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Structure of the ONION collection by country of origin

Country of origin	Number of accessions	Country of origin	Number of accessions
Germany	134	Former Soviet Union	24
Georgia	52	Albania	19
Romania	27	Netherlands	18
Italy	25	Former Czechoslovakia (not specified further)	16

Comments:
Allium cepa

Other accs: 166

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Biology status of the GARLIC collection and ability to flower

Biological status	Number of accessions
Wild	30 (+2 weedy)
Advanced or improved cultivar	44
Breeding/research material	3
Traditional cultivar/landrace	320
unknown	63

Ability to flower	Number of accessions
Bolting garlic	164
Non bolting	66
Semibolting	12
Not grouped	194

Comments:
Allium sativum

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Biology status of the ONION collection

Biological status	Number of accessions
Wild	3
Advanced or improved cultivar	124
Breeding/research material	89
Traditional cultivar/landrace	248
unknown	17

Comments:
Allium cepa

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Published Article

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Review

Challenges and Prospects for the Conservation of Crop Genetic Resources in Field Genebanks, in In Vitro Collections and/or in Liquid Nitrogen

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Abstract: The conservation of crop genetic resources, including their wild relatives, is of utmost importance for the future of mankind. Most crops produce orthodox seeds and can, therefore, be stored in seed genebanks. However, this is not an option for crops and species that produce recalcitrant (non-storable) seeds such as cacao, coffee and avocado, for crops that do not produce seeds at all; therefore, they are inevitably vegetatively propagated such as bananas, or crops that are predominantly clonally propagated as their seeds are not true to type, such as potato, cassava and many fruit trees. Field, in vitro and cryopreserved collections provide an alternative in such cases. In this paper, an overview is given on how to manage and setup a field, in vitro and cryopreserved collections, as well as advantages and associated problems taking into account the practical, financial and safety issues in the long-term. In addition, the need for identification of unique accessions and elimination of duplicates is discussed. The different conservation methods are illustrated with practical examples and experiences from national and international genebanks. Finally, the importance of establishing safe and long-term conservation methods and associated backup possibilities is highlighted in the frame of the global COVID-19 pandemic.

Keywords: clonal crops; collection management; cryobiotechnology; cryopreservation; field collections; field maintenance; germplasm storage; in vitro conservation; recalcitrant seeds

1. Introduction

In the course of crop domestication, many plants have been selected for quantity and/or quality of their seed, while some have been cultivated for their roots, tubers, fruits, stems and leaves. Plant genetic resources for food and agriculture (PGRFA) are of strategic importance to ensure sustainable crop production [1], nutritious food and food security for humans and to enhance economic prosperity of the present and future generations. They comprise the sum of genes, gene combinations or genotypes which serve as a reservoir for direct use in food production systems and for breeding new varieties [2].

Since the beginning of agriculture, selection of plants and seeds for sowing, growing, harvest and storage gave rise to locally adapted varieties, so-called "landraces", that reveal specific variations of morphological and yield characteristics and quality traits. In the mid-19th century, the rediscovery of Gregor Mendel's work and the introduction of breeding schemes resulted in the development of high-yielding and more stress-tolerant varieties leading to higher crop yields. This laid the foundation

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Status of documentation

- Descriptors used: IPGRI, ECP/GRand AVRDC. 2001. Descriptors for Allium (*Allium spp.). International Plant Genetic Resources Institute, Rome, Italy; European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR), Asian Vegetable Research and Development Center, Taiwan.*
- Documentation system (software): GBIS
- % characterized: Allium & Shallot Core Collection
- C&E data to EURISCO: yes, if available
- Pictures available: yes from the
  - Allium & Shallot Core Collection
  - TAX garden

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Acquisitions

- Any plans to fill gaps: NO

- Acquisition strategy: direct collecting/ from companies / genebanks, etc.

  NO

Use of the collection

- Availability of material: 90% is restricted available via SMTA
- Cooperation with users: NO
- Ongoing projects:
  - Sequencing project
  - Proposal submitted:
    Garlic metabolite analysis
    with organic farmers

Main problems

- Management and budget of the Taxonomic Reference Collection
- Allium trained taxonomists retired at IPK
- Lack of cryopreservation protocols for different *Allium* species
- Lack of funds to support cryo
- Identification of duplicates, threshold levels
- Management of different databases

Proposals for collaborative activities within the Working Group

- Projects on characterization, evaluation, genotyping to support
  - the identification of duplicates and unique material
  - taxonomic decisions
  - the exchange of material for collection management (& fill gaps)
  - breeders and increase usability of material
  - to prioritize cryopreservation of European accessions
  - to guide collection missions
- Criteria for duplicate identification need to be defined
- Databases require rationalizing and improvement
- Cryopreservation workshop
- Support needed to maintain large collection of wild Allium collections

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I like to invite you to IPK Gatersleben
and to see the wonderful Allium collection
B03
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1854
1018
2347